as "very distinct and immediately conspicuous" (Tempel, *Monthly Notices*, vol. xl. p. 622).

The truth seems to be that, whether variable or not, it is one of the most sensitive objects in the sky. The slightest haze suffices to obliterate it. Air so translucent as to allow 13th or 14th magnitude stars to shine clearly may still contain mist enough to shroud the Merope nebula. Nor will it endure high magnification. Its scanty rays need to be condensed into a small image to become sensible, while, in the restricted field of a great telescope, they are apt to leave the eye unaffected for want of a contrasted black background. Even the enormous light-grasp of the Rosse reflector was unavailing to show this delicate object until the lowest possible powers were applied. Idiosyncracies both of instruments and observers have besides tended to widen divergences of opinion. Some eyes appear to be incapable of discerning an illumination so faint and diffused. Nay, telescopes of equal apertures are not perhaps devoid of "personality" regarding it.

Still more difficult to explain than its anomalous invisibility, are the differences in its aspect when seen. Goldschmidt made the supposed discovery in 1863 (*Les Mondes*, t. iii. p. 529) that it was no isolated formation, but a spur or projection inwards from a vast nebulosity 5° in diameter, in which a blank central space similar to that left clear for the trapezium in the Orion nebula, was occupied by the entire group of the Pleiades. And Wolf, after careful consideration, adopted this view in 1876. Other observers have seen several distinct patches in lieu of the large misty ellipse, about 35′ by 20′, in which M. Tempel could just distinguish the beginnings of two nuclear condensations. Engelmann's map of the Pleiades, published in 1876 (in Bd. ii. of Bessel's *Abhandlungen*), shows a mere nebulous wisp to the south of, and apparently unconnected with, Merope. Two such were observed by MM. Baillaud and André, at Paris, March 7, 1874, and form the regular aspect of the nebula as viewed with Mr. Pratt's 8-inch mirror. Mr. Common's great speculum disclosed to him, February 3, 1880, a triple and considerably scattered group, with unmistakable symptoms of an extension north-west towards Electra. Now at last the camera steps in as arbiter between conflicting observations. The Paris photographs decide at once the Merope nebula to be no such illusory object as has sometimes been supposed. It really exists; but in a shape *at present* strangely varied from that of its earlier appearances. Only its position on either side of the star Merope identifies the irregularly striated formation visible on the plates, with the uniform train of almost evanescent luminosity recorded in M. Tempel's skilful drawings.

Comparison with future autographic pictures will quickly and easily settle the question of its variability. As yet there is little positive, though some presumptive, evidence for the affirmative. Hind's and Chacornac's admittedly variable nebulæ are situated not far off, one in the head, the other near the tip of the right horn, of Taurus. And it is unquestionable that some kinds of sidereal phenomena tend to localise themselves in certain quarters of the sky. There is, moreover, reason to believe that a nebula has vanished from the heart of the cluster itself. Such an object is marked on Jeaurat's chart of the Pleiades (published in 1782) in connection with a pair of small stars nnmbered by Bessel 31 and 32. These lie about half a lunar diameter north of Pleione, in a quarter where no vestige of nebulosity can now be distinguished; so that the possibility is excluded of Jeaurat's having merely anticipated subsequent discoveries. The stars 31 and 32 form a binary system already giving signs of mutual revolution; and one of them (No. 32) is considered by Lindemann as variable. If any weight attached to Jeaurat's estimates of brightness, there could be no doubt about the matter, since he stated them to be respectively of 7th and 4th magnitudes, while Bessel found them both of the 8th. Jeaurat's authority in photometry, it is true, is of the lowest; yet it is hard to believe that his eye can have represented to him a difference of three whole orders between two equal stars, visible side by side in one field of his telescope.

Stellar fluctuations have so frequently been observed to be associated with nebulous surroundings, that it is worth noting, as at least a coincidence, that neither Merope nor Maia is exempt from a strong suspicion of variability. The latter, according to M. Wolf, is slowly gaining lustre; the former oscillates through a range of one magnitude.

The stars of the Pleiades are immeasurably far off. None of them has any sensible parallax; and we are thus uninformed as to their intrinsic lustre, mutual distance, or gravitating mass. It is, however, easy to compute the dimensions of the group relatively to its remoteness from ourselves.[1] A circle described from Alcyone with a radius of 48′ includes all its principal stars. Only one of Bessel's 53 falls outside it. We may then take the globular mass of the cluster to be of this apparent size, disregarding the stellar streams external to it as being, more or less, outliers. Now, since the sine of an angle of 48′ is to radius as (in round numbers) 1 : 71, it follows that the furthest of the suns congregated into the nuclear group under consideration, are just 71 times as distant from us as from the centre of their own system. Consequently, Alcyone blazes upon them with 5000 times the lustre it displays to us, or as a star about 86 times the brilliancy of Sirius. It would still, however, seem a star rather than a sun. Even from the distance of Neptune, our own central luminary must outshine Alcyone, as viewed, say, from Atlas or Taygeta, fully 77,000 times.

The glimpse afforded by recent investigations of the structure of the Pleiades group is a very surprising one. We find in it a miniature sidereal system, the richness and variety of which bewilder theoretical conceptions, and recall, as analogous, the accumulated wonders of the Magellanic clouds. Nebulæ are discovered in most intimate connection with lucid stars, and in suspicious relations to their luminous vicissitudes, while themselves possibly subject to strange alternations of visibility. Stars of all orders are included in one vast assemblage, some doubtless magnificent orbs, of many times the radiance of our sun; others as inferior to them perhaps as the moons of Mars to Jupiter. The distribution of these bodies appears to be no less varied than their size. Groups are collected within the main group, systems revolve apart, the subordination of which to the laws of a general federative union leaves their internal liberty of movement unshackled. It is not, indeed, certain that a dynamical equilibrium of the whole subsists. Hints of a centrifugal tendency have been caught by M. Wolf, suggesting that an impulse of separation may at present be the predominating one. Possibly, then, Mr. Stone's curious observations on the slowly divergent proper motions of some southern stars, apparently the remnants of broken-up systems, may exemplify the inscrutable destinies in store for the unnumbered stars of the Pleiades.

A. M. CLERKE

NOTES

SCIENCE was *en fête* at the Mansion House on Tuesday night, when the Lord Mayor and Lady Mayoress received the Presidents and Members of Council of the Royal and other principal Learned Societies. Everything passed off in the most admirable way, and the presence of about 100 ladies, as well as of 200 of our representative men of science, made the gathering a very brilliant as well as a very remarkable one. The present

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[1] As was done by the Rev. J. Michell in 1767 (*Phil. Trans.*, vol. lvii. p. 257).

Lord Mayor is entirely to be congratulated on this new departure.

ON Monday last the galleries in the west wing of the British Museum, hitherto occupied by natural history objects which have been removed to South Kensington, were thrown open to the public. Besides a rare collection of objects of Oriental art, sacred and profane, the galleries are now the home of the ethnographical collections belonging to the British Museum, including the famous Christy Collection presented by the trustees to the nation. When Mr. Christy died in 1865 he left his prehistoric and ethnographical collections, together with a sum of money, to four trustees, with power to dispose of them to any existing institution, or to create an institution for them if this course should prove desirable. One portion of the collections had been arranged prior to Mr. Christy's death by Mr. Steinhauer of Copenhagen, and the trustees decided on offering this to the British Museum, together with a selection of objects of the same kind made from the remainder of the collections. This offer was accepted in 1866, but, owing to the crowded state of the National Collection, a temporary place of deposit was taken at 103, Victoria Street, formerly occupied by Mr. Christy. Here the scattered collections were brought together and incorporated with that arranged by Mr. Steinhauer; various additions were made from time to time during the past twenty years, either by presentation, or by purchase from the income arising from the sum left by Mr. Christy for the purpose of maintaining the collection. The ethnographical portion has now been removed to the British Museum, and is incorporated with the collections previously in the Museum. One provision of the gift by the trustees to the nation was that the collection should be actually placed in the British Museum, and exhibited there, and as this condition was not fulfilled until Monday last, it follows that it was only on and from that day that the Christy Ethnographical Collection became the national property. The prehistoric collection will, in like manner, be incorporated with the prehistoric collections already in the British Museum, and will shortly be arranged in the room between the top of the staircase and the ethnographical collection.

OF the new galleries and their contents it would be impossible to speak adequately here. They do not yield their secret in the course of a few cursory visits; each one of the many sections is a study in itself, and will engage the attention of the ethnologist and of the student of *Culturgeschichten*. The first room contains, on the left, the arms and armour of the civilised nations of Asia, from the Burgess, Meyrick, and Henderson collections, while the other side is occupied by the weapons and implements of the less civilised or barbarous Asiatic peoples; these come from Borneo, the Nicobars, Ceylon, the Khonds of Orissa, tribes inhabiting parts of Burmah and Northern Siam, the Nagas of Assam, the Ainos, and the tribes of Northern Asia. The second room is occupied by the utensils, weapons, implements, dress, &c., of Java, Sumatra, Australia, and New Guinea on the left; and on the right by those of Borneo, the Asiatic islands, Micronesia, and New Zealand. The last is an excellent collection, and one which it would be now very difficult, if not impossible, to collect again. The third room is devoted to the Pacific islands, to New Ireland, New Britain, the Solomon Islands, Fiji, the Harvey, Society, Friendly, Samoan, and Savage Islands. The centre of this room is occupied by two magnificent specimens of the canoes of the Solomon islanders. This room also contains the Sandwich Islands collection, which is now absolutely priceless, for it could never again be obtained. The fourth room is nearly wholly devoted to Africa, but the American collection (which appears to be greatly cramped for space) overflows into it. On the left we have South and West Africa represented, and North America; on the right we have the Marquesas and Easter Island, Madagascar, Eastern Central Africa, Abyssinia, North Africa, and Arctic America. The fifth and last room is possibly the most interesting and valuable of all. It is devoted to America. We commence on the left with the Ancient West Indies, which are mainly represented by stone implements; this is succeeded by a wonderful collection representing Ancient Mexico. Here also stone implements and pottery (especially the latter) abound; then come Central America and New Granada, and finally an invaluable collection representing the Inca civilisation of Ancient Peru. On the right of this room the collections from Modern Mexico, North-Western and Arctic America are placed. In this abounding wealth of ethnological objects it is difficult to specify one section which attracts the eye more than another. Each visitor, according to his tastes and course of study, will select for himself, but, as we have already suggested, the New Zealand, Sandwich Island, Ancient West Indian, Ancient Peruvian, and Ancient Mexican collections are probably unrivalled elsewhere in the world. When the prehistoric collections shall have been arranged, the British Museum will have at last materials for the illustration of the history of mankind worthy of the British nation.

WE understand that Mr. John Smith, Curator of the Royal Gardens, Kew, has, in consequence of ill-health, resigned his appointment, which he has held for a period of twenty-two years.

A STRONGLY supported memorial has been presented to the Lord President of the Council, urging the desirability of establishing a Medical Faculty and an Engineering School at Cardiff, in connection with the University College of South Wales. Forcible reasons are given for the establishment of the former in so thickly populated a region; and as several of the subjects required for medical students are already taught at Cardiff, it need not be difficult to supplement them, so as at least to carry medical studies to all but the final stage for the medical degree. As to an Engineering School, it is pointed out—that the engineering and colliery interests in the district are second to none in the world, while the rapidity of their growth has been unparalleled in our national history; that the urgent need for the establishment of a Faculty of Engineering in connection with the University College of South Wales and Monmouthshire is shown by the fact that no less than 90,000 skilled workmen are employed in the vast collieries, and in the iron, steel, tin, copper, chemical, and general engineering works of the district; that those who direct and manage the operations of these large industries (at a low estimate in number more than 4000 persons) must at present, in order to obtain a technical training, proceed to distant parts of the United Kingdom or to the Continent; so that for the great bulk of the people there are insuperable difficulties in the way of that higher education which is becoming more and more necessary in the face of the growing competition with Continental nations, and the greater advantages in the way of technical education offered by Germany, France, and other countries. It is to be hoped that Government will grant the prayer of the petition, and provide the funds necessary to establish the necessary Chairs.

IT is intended to hold a Photographic Exhibition in Glasgow, in the Corporation Galleries of Art, during July, August, and September, 1886. The Exhibition will comprise:—(I.) Illustrations of the history of photography, early daguerreotypes, calotypes, &c.; (II.) photographic instruments, materials and appliances, lenses, cameras, chemicals, &c.; (III.) illustrations of modern processes in photography; (IV.) applications of photography: portraiture, landscape photographs, architecture, reproductions of pictures, drawings, etchings, and engravings, photolithographs, photogravures, copying plans, maps, mechanical drawings, illustration of books, decoration of glass, pottery, &c., astronomy, meteorology, microscopy, &c. The object of the Exhibition is to illustrate the history and development of photography, and to show the numerous and important applications of the art to science, art, and industry. All objects selected for exhibition will be chosen with the view of promoting the educational value of the collection. The elements of competition and trade will not enter into the Exhibition, nor will there be any prize offered to exhibitors. Portraits will be shown only in so far as they may serve to illustrate the various methods of portrait photography, or special features of size, treatment, &c. Landscapes may be accepted on account of the interest of the subject, as well as for technical excellence. Reproductions of art objects will be received both as illustrations of processes and for the artistic interest and importance they possess. Communications respecting the business of the Exhibition should be addressed to the Secretary of the Museum and Galleries Committee, Town Council, Glasgow.

Mr. George R. Rogerson, an old pupil of the College, has presented his valuable astronomical observatory to the Council of Liverpool College. The instruments include an equatorially-mounted refracting telescope, a spectroscope with ten prisms, a micrometer, and also an astronomical library.

An important essay on micro-chemical reactions has just been published in Brussels by MM. Klement and Renard. Availing themselves of the published researches of Boricky, Behrens, Streng, Lehmann, Haushofer, and others, combined with the results of their own extensive researches, the authors have produced the most complete account of the subject which has yet appeared. They describe the methods of research and the reactions, simple and characteristic, by which compounds of more than fifty elementary bodies may be identified in minute crystals recognisable under the microscope. They also give a brief description of the processes of isolation and identification applicable to such compounds as the mineral constituents of rocks. The value of the treatise is much enhanced by the accompanying plates, eight in number, comprising nearly 100 figures of the forms of crystals obtained by the various reactions described in the text.

An International Congress of Climatologists and Hydrologists is appointed to meet at Biarritz during the first week in October. The co-operation of the various medical, hydrological, and meteorological societies of France has been received; the Minister of Commerce will open the first meeting on October 1, and Dr. Durand-Fardel of Paris will be the President. The object of the Congress will be to assemble specialists from every country to discuss questions connected with hydrology and climatology. Excursions are to be made to various watering-places in the Pyrenees.

The sale of a considerable portion of the celebrated Godeffroy Ethnological Collection from the South Sea Islands, at Hamburg, to the Leipzig Museum, has already been recorded. The portion thus sold appears to have been mortgaged by the owner, and the sale was made by the mortgagees. The remaining part, which was not mortgaged, and which included very valuable zoological and palæontological collections, as well as a comprehensive collection of woods from the South Seas, has just been purchased by the city of Hamburg for 85,000 marks.

Mrs. Ogilvie, of Sizewell House, has presented 1300*l.* to the Ipswich Museum, to clear off the debt attaching to the building.

The Municipal Council of Paris at its sitting of the 29th ult. resolved to vote a sum of 5000 francs to M. Georges Poucher, to enable him to continue his investigations into the course of the Gulf Stream.

The additions to the Zoological Society's Gardens during the past week include a Macaque Monkey (*Macacus cynomolgus* ♀) from India, presented by Mrs. Carter; a Black-eared Marmoset (*Hapale penicillata*) from South-East Brazil, presented by Mr. A. Evershed; two Three-toed Sloths (*Bradypus tridactylus*) from British Guiana, presented by Capt. Hicks; a Crested Porcupine (*Hystrix cristata*) from Ceylon, presented by Miss C. S. Simpson; a Crested Porcupine (*Hystrix cristata*) from South Africa, presented by the Rev. G. H. R. Fisk, C.M.Z.S.; a Black-backed Jackal (*Canis mesomelas*) from South Africa, presented by Mr. John Hewat; an Indian Antelope (*Antilope cervicapra*) from India, presented by Capt. J. C. Robinson; a Herring Gull (*Larus argentatus*), British, presented by Capt. H. G. Alexander; a Ceylonese Hanging Parrakeet (*Loriculus asiaticus*) from Ceylon, presented by Mr. C. W. Rosset; a Clouded Tiger (*Felis macroceiis*) from Assam, a Burchell's Zebra (*Equus burchelli* ♂) from South Africa, two Globose Curassows (*Crax globicera* ♀ ♀) from Central America, deposited; two Black-footed Penguins (*Spheniscus demersus*) from South Africa, purchased; a Lesser Koodoo (*Strepsiceros imberbis* ♂) from Somali Land, a Ruddy Sheldrake (*Tadorna casarca*), European, received in exchange; two Black-backed Jackals (*Canis mesomelas*), an Eland (*Oreas canna* ♂), born in the Gardens.

OUR ASTRONOMICAL COLUMN

Parallax of Nova Andromedæ.—Prof. Asaph Hall, writing under date February 12, in the *American Journal of Science*, states that this star was then very near the limit of visibility in the great refractor of the Washington Observatory. It had thus in five months faded down from "the limit of visibility to the naked eye to that in a 26-inch telescope." Led by the suggestion of Prof. Peters that it would be interesting to test the parallax of such a star, Prof. Hall began on September 29 a series of measures of the Nova, referring it by means of polar co-ordinates to a known star of the eleventh magnitude, distant from it a little less than 2′. The measures do not, in Prof. Hall's opinion, show any proof of a parallax, though they indicate perhaps a diminution of the apparent distance from the comparison star. The variation in the brightness of the star would, however, be likely to affect the measures. The star was too faint for the measures to be continued after February 7.

Prof. Hall mentions favourably Mr. W. H. Monck's suggestion (*Observatory*, vol. viii. p. 335) that the Nova may have been a swiftly-moving star "that in rushing through the nebula had been set on fire like a meteor in our atmosphere."

M. Lœwy's Method of Determining the Elements of Refraction.—Mr. Gill, writing on the subject of M. Lœwy's proposal to determine the elements of refraction by means of a reflecting prism placed in front of the object-glass of an equatorial (Nature, vol. xxxiii. p. 303), whilst expressing his appreciation of the merits of the French *savant's* scheme, suggests that, in place of having the tube of the telescope fixed and the prism movable with respect to it, it would be better to have the prism rigidly attached to the objective, the micrometer threads being parallel to the line of intersection of the reflecting surfaces of the prism, and the whole tube capable of rotation round its axis. By this arrangement a sufficiently firm connection would be established between the prism and the micrometer, and the necessity of calculating the direction of the line of measurement by the latter would be entirely obviated. It is also pointed out by Mr. Gill that the carrying out of M. Lœwy's plan necessitates the construction of a complete special apparatus, but that it would be comparatively easy to adapt the modern heliometer to this kind of observation. It would only be necessary to mount the prism symmetrically in front of the object-glass, so that the line of intersection of the reflecting surfaces should be at right angles to the line of section of the object-glass, and to the axis of the heliometer. The observations would then be made by bringing the images of the two stars into coincidence near the centre of the field by symmetrical movements of the segments of the objective, as in the ordinary process of measurement with this instrument. This method of observation is, in Mr. Gill's opinion, the most convenient and the most accurate of all those known at the present time, and